



## DEFENSE INFORMATION SYSTEMS AGENCY

JOINT INTEROPERABILITY TEST COMMAND

P.O. BOX 12798

FORT HUACHUCA, ARIZONA 85670-2798

IN REPLY  
REFER TO:

Networks and Transport Division (JTE)

6 February 2006

### MEMORANDUM FOR DISTRIBUTION

**SUBJECT:** Special Interoperability Test Certification of the Tandberg 6000 MXP Video Teleconferencing (VTC) System with Software Release F.2.3 NTSC

**References:** (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004  
(b) CJCSI 6212.01C, "Interoperability and Supportability of Information Technology and National Security Systems," 20 November 2003

1. References (a) and (b) establish the Defense Information Systems Agency, Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.
2. The Tandberg 6000 MXP VTC System with Software Release F.2.3 NTSC, hereinafter referred to as the system under test (SUT), meets all of the critical interface and functional requirements for a VTC system and is certified for joint use within the Defense Switched Network (DSN). The SUT met the interface and functional requirements for a VTC system as set forth in appendix 8 of reference (c). The SUT supports International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) H.323 and Session Initiation Protocol (SIP) Internet Protocol interfaces. However, there are no Joint Staff requirements defined for VTC via ITU-T H.323 or SIP to guarantee assured service, therefore the ITU-T H.323 and SIP interfaces are not covered by this certification. Testing was conducted using test procedures derived from reference (d). This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.
3. This certification is based on interoperability testing conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 7 March through 8 April 2005, a regression test period from 10 through 14 October 2005, and approval of vendor Letters of Compliance completed on 27 May 2005. The Certification Testing Summary (enclosure 2) documents the test results and describes the test configuration. Users should verify interoperability before deploying the SUT in an environment that varies significantly from that described.
4. The Functional Requirements used to evaluate the interoperability of the SUT and the interoperability statuses are indicated in table 1.

JITC Memo, JTE, Special Interoperability Test Certification of the Tandberg 6000 MXP Video Teleconferencing (VTC) System with Software Release F.2.3 NTSC

**Table 1. SUT Functional Requirements and Interoperability Status**

Interface	Critical	Certified	Requirements Required or Conditional	Status	Reference
ISDN BRI	No <sup>1</sup>	Yes	FTR 1080B-2002 (R)	Met	A8.5
			ITU-T H.320 in accordance with FTR 1080B-2002 (R)	Met	A8.5
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with GSCR, Appendix 7 (CPE) (C)	Met	A8.5
			Integrated BRI interface shall be in conformance with Terminal Adaptor requirements in GSCR, Appendix 7 (CPE) (R)	Met	A8.5
ISDN PRI T1 ISDN PRI E1	No <sup>1</sup>	Yes	FTR 1080B-2002 (R)	Met	A8.5
			ITU-T H.320 in accordance with FTR 1080B-2001 (R)	Met	FTR 1080B-2202 Section 9.1
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with GSCR, Appendix 7 (CPE) (C)	Met	A8.5
			Integrated PRI interface shall be in conformance with IAS requirements in GSCR, Appendix 6 (IAS) (R)	Met	A8.5
<b>SERIAL INTERFACES</b> EIA-366A EIA-449 EIA-530 ITU-T V.35 <sup>2</sup>	No <sup>1</sup>	Yes	Connections shall be in conformance with the requirements for serial interface(s) as described in FTR 1080B-2002 (C)	Met	A8.5
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations (R)	Met	A8.5
	Yes	See note 3.	Security in accordance with DITSCAP (R)	See note 3.	A8.7
<b>LEGEND:</b> A - GSCR Appendix BRI - Basic Rate Interface C - Conditional CPE - Customer Premise Equipment DISA - Defense Information Systems Agency DITSCAP - Department of Defense Information Technology Security Certification and Accreditation Program E1 - European Basic Multiplex Rate (2.048 Mbps) EIA - Electronic Industries Alliance EIA-366A - Standard for interface between data terminal equipment and automatic calling equipment for data communication EIA-449 - Standard for 37-position and 9-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange EIA-530 - Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange FTR - Federal Telecommunications Recommendation GSCR - Generic Switching Center Requirements H.320 - Standard for narrowband VTC IAS - Integrated Access Switch ISDN - Integrated Services Digital Network ITU-T - International Telecommunication Union - Telecommunication Standardization Sector kbps - kilobits per second KHz - KiloHertz Mbps - Megabits per seconds PRI - Primary Rate Interface R - Required SUT - System Under Test T1 - Digital Transmission Link Level 1 (1.544 Mbps) V.35 - Standard for data transmission at 48 kbps using 60-108 KHz group band circuits V.36 - Modems for synchronous data transmission using 60-108 KHz group band circuits V.37 - Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 KHz group band circuits VTC - Video Teleconferencing					
<b>NOTES:</b> 1 The VTC system interface requirements can be met with an ISDN BRI, ISDN PRI, or Serial interface. 2 The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37. 3 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.					

5. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/.gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>.

JITC Memo, JTE, Special Interoperability Test Certification of the Tandberg 6000 MXP Video Teleconferencing (VTC) System with Software Release F.2.3 NTSC

6. The JITC point of contact is Mr. John Hooper, DSN 879-5041, commercial (520) 538-5041, FAX DSN 879-4347, or e-mail to John.Hooper@disa.mil.

FOR THE COMMANDER:



RICHARD A. MEADOR  
Chief  
Networks and Transport Division

2 Enclosures a/s

Distribution:

Joint Staff J6I, Room-1E565, Pentagon, Washington, DC 20318-6000  
Joint Interoperability Test Command, Washington Operations Division, NSWC, ATTN: JT1,  
Building 900, 101 Strauss Avenue, Indian Head, MD 20640-5035  
Defense Information Systems Agency, GIG Enterprise Services Engineering Directorate,  
NETCENTRICITY, REQUIREMENTS, ANALYSIS & ASSESSMENTS BRANCH, ATTN:  
GE333, Rm. 244, 5600 Columbia Pike, Falls Church, VA 22041-2770  
Defense Information Systems Agency, GIG-Combat Support Directorate, DSN SYSTEMS  
MANAGEMENT BRANCH, ATTN: GS235, Rm. 5W248A, 5275 Leesburg Pike, Falls  
Church, VA 22041  
Office of Chief of Naval Operations (N61C22), CNON6/7, 2000 Navy Pentagon, Washington,  
DC 20350  
Headquarters US Air Force, AF/XICC, 1250 Pentagon, Washington, DC 20330-1250  
Department of the Army, Office of the Secretary of the Army, G-6/ASA (ALT), ATTN:  
ASAALT (SAAL-SSI), 103 Army Pentagon, Washington, DC 20310-0103  
US Marine Corps (C4ISR), MARCORSYSCOM, 2200 Lester Street, Quantico, VA 22134  
DOT&E, Strategic and C3I Systems, 1700 Defense Pentagon, Washington, DC 20301-1700  
US Coast Guard, COMDT/G-SCE (C4), 2100 2nd Street SW, Washington, DC 20593  
Office of Assistant Secretary of Defense, OASD(NII)/DoD CIO, Crystal Mall 3, 7<sup>th</sup> Floor, Suite  
700, 1931 Jefferson-Davis Hwy, Arlington, VA 22202  
Office of Under Secretary of Defense, OUSD(AT&L), Room 3E144, 3070 Defense Pentagon,  
Washington, DC 20301  
US Joint Forces Command, J6I, C4 Plans and Policy, 1562 Mitscher Ave, Norfolk, VA 23551-  
2488  
Defense Intelligence Agency, ATTN: DS-CIO, Bldg 6000, Bolling AFB, Washington, DC  
20340-3342  
National Security Agency, ATTN: DT, Suite 6496, 9800 Savage Road, Fort Meade, MD  
20755-6496  
Defense Information Systems Agency (DISA), ATTN: GS23 (Mr. Osman), Room 5w23, 5275  
Leesburg Pike (RTE 7), Falls Church, VA 22041

## **ADDITIONAL REFERENCES**

- (c) Defense Information Systems Agency, "Department of Defense Voice Networks Generic Switching Center Requirements (GSCR), Incorporated Change 1," 1 March 2005
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 23 April 2004

## CERTIFICATION TESTING SUMMARY

**1. SYSTEM TITLE.** The Tandberg 6000 MXP Video Teleconferencing (VTC) System with Software Release F.2.3 NTSC, hereinafter referred to as the system under test (SUT).

**2. PROPONENT.** Defense Information Systems Agency (DISA).

**3. PROGRAM MANAGER.** Mr. Howard Osman, GS23, Room 5W23, 5275 Leesburg Pike, Falls Church, VA 22041, e-mail: Howard.Osman@disa.mil.

**4. TESTER.** Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

**5. SYSTEM UNDER TEST DESCRIPTION.** The SUT offers the following product features and highlights:

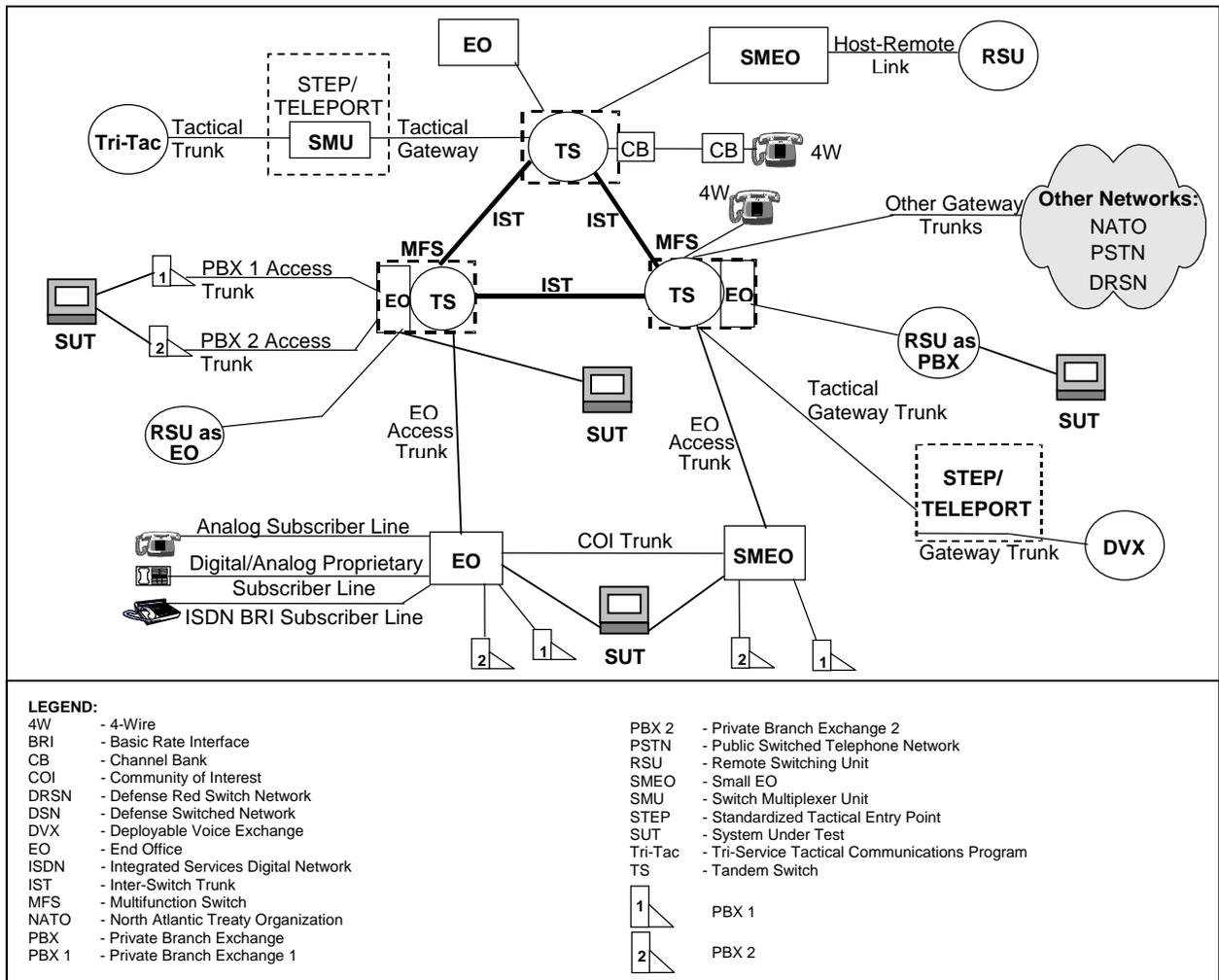
### Features:

- One or two monitors, wireless remote control, TRACKER, Wide Angle View (W.A.V.E) II camera, microphone
- Video bandwidth: International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) H.320 up to 2 Megabits per second (Mbps), ITU-T H.323 up to 4 Mbps (not certified), Session Initiation Protocol (SIP) up to 4 Mbps (not certified)
- CD-Quality 20 KiloHertz Mono and Stereo
- Four separate acoustic echo cancellers
- Audio mixer, Automatic Gain Control, Automatic Noise Reduction

### Highlights:

- Supports Integrated Services Digital Network (ISDN) Basic Rate Interface and Primary Rate Interface, Digital Transmission Link Level 1 (T1), or European Basic Multiplex Rate (E1)
- Serial support: ITU-T V.35, Electronic Industries Alliance (EIA)-530, and EIA-449 with EIA-366 dialing
- Support for the Tandberg Management Suite Total management via embedded web server, Simple Network Management Protocol, Telnet, Extensible Markup Language, Simple Object Access Protocol, and File Transfer Protocol
- Video formats supported: National Standards Television Committee, Phase Alternate Line, Super Video Graphics Array, Wide Extended Graphics Array (XGA), Super XGA
- Audio standards: ITU-T G.711, ITU-T G.722, ITU-T G.722.1, ITU-T G.728
- Video standards: ITU-T H.261, ITU-T H.263, ITU-T H.263+, ITU-T H.263++, ITU-T H.264

**6. OPERATIONAL ARCHITECTURE.** The Generic Switching Center Requirements (GSCR) Defense Switched Network (DSN) architecture in figure 2-1 depicts the relationship of the SUT to the DSN switches.



**Figure 2-1. DSN Architecture**

**7. REQUIRED SYSTEM INTERFACES.** Requirements specific to the SUT and interoperability results are listed in table 2-1. These requirements are derived from the GSCR, appendix 8, Interface and Functional Requirements and verified through JITC testing and review of vendor's Letter(s) of Compliance (LoC).

**Table 2-1. SUT Functional Requirements and Interoperability Status**

Interface	Critical	Certified	Requirements Required (R) or Conditional (C)	Status	Reference
ISDN BRI	No <sup>1</sup>	Yes	FTR 1080B-2002 (R)	Met	A8.5
			ITU-T H.320 in accordance with FTR 1080B-2002 (R)	Met	A8.5
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ISDN PRI T1 ISDN PRI E1	No <sup>1</sup>	Yes	FTR 1080B-2002 (R)	Met	A8.5
			ITU-T H.320 in accordance with FTR 1080B-2001 (R)	Met	FTR 1080B-2202 Section 9.1
			Audio add-on interface, implemented independently of an IAS, shall be in accordance with GSCR, Appendix 7 (CPE) (C)	Met	A8.5
			Integrated PRI interface shall be in conformance with IAS requirements in GSCR, Appendix 6 (IAS) (R)	Met	A8.5
<b>SERIAL INTERFACES</b> EIA-366A EIA-449 EIA-530 ITU-T V.35 <sup>2</sup>	No <sup>1</sup>	Yes	Connections shall be in conformance with the requirements for serial interface(s) as described in FTR 1080B-2002 (C)	Met	A8.5
			Physical, electrical, and software characteristics shall not degrade or impair switch and associated network operations (R)	Met	A8.5
	Yes	See note 3.	Security in accordance with DITSCAP (R)	See note 3.	A8.7

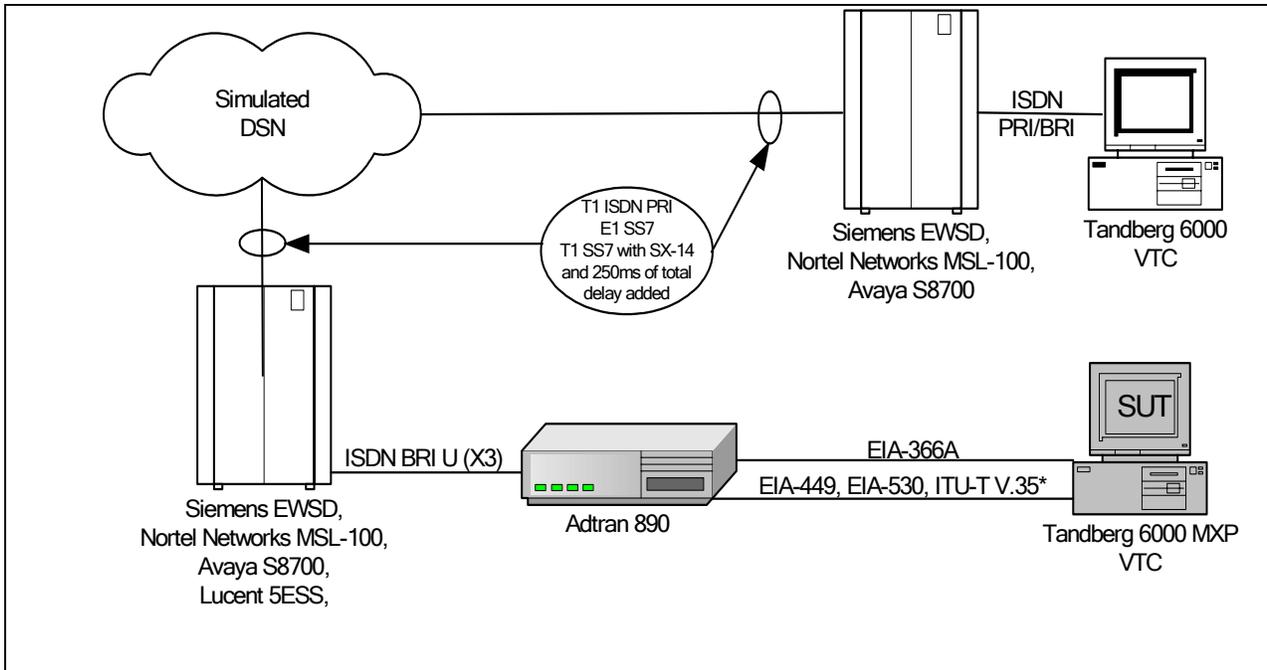
**LEGEND:**

A	- GSCR Appendix	IAS	- Integrated Access Switch
BRI	- Basic Rate Interface	ISDN	- Integrated Services Digital Network
C	- Conditional	ITU-T	- International Telecommunication Union - Telecommunication Standardization Sector
CPE	- Customer Premise Equipment	kbps	- kilobits per second
DISA	- Defense Information Systems Agency	KHz	- KiloHertz
DITSCAP	- Department of Defense Information Technology Security Certification and Accreditation Program	Mbps	- Megabits per seconds
E1	- European Basic Multiplex Rate (2.048 Mbps)	PRI	- Primary Rate Interface
EIA	- Electronic Industries Alliance	R	- Required
EIA-366A	- Standard for interface between data terminal equipment and automatic calling equipment for data communication	SUT	- System Under Test
EIA-449	- Standard for 37-position and 9-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange	T1	- Digital Transmission Link Level 1 (1.544 Mbps)
EIA-530	- Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange	V.35	- Standard for data transmission at 48 kbps using 60-108 KHz group band circuits
FTR	- Federal Telecommunications Recommendation	V.36	- Modems for synchronous data transmission using 60-108 KHz group band circuits
GSCR	- Generic Switching Center Requirements	V.37	- Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 KHz group band circuits
H.320	- Standard for narrowband VTC	VTC	- Video Teleconferencing

**NOTES:**

- 1 The VTC system interface requirements can be met with an ISDN BRI, ISDN PRI, or Serial interface.
- 2 The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37.
- 3 DITSCAP information assurance testing is accomplished via DISA-led Information Assurance test teams and published in a separate report.

**8. TEST NETWORK DESCRIPTION.** The SUT was tested at JITC's Global Information Grid Network Test Facility (GNTF) in a manner and configuration similar to that of the DSN operational environment. Testing the system's required functions and features was conducted using the test configurations depicted in figures 2-2 and 2-3.

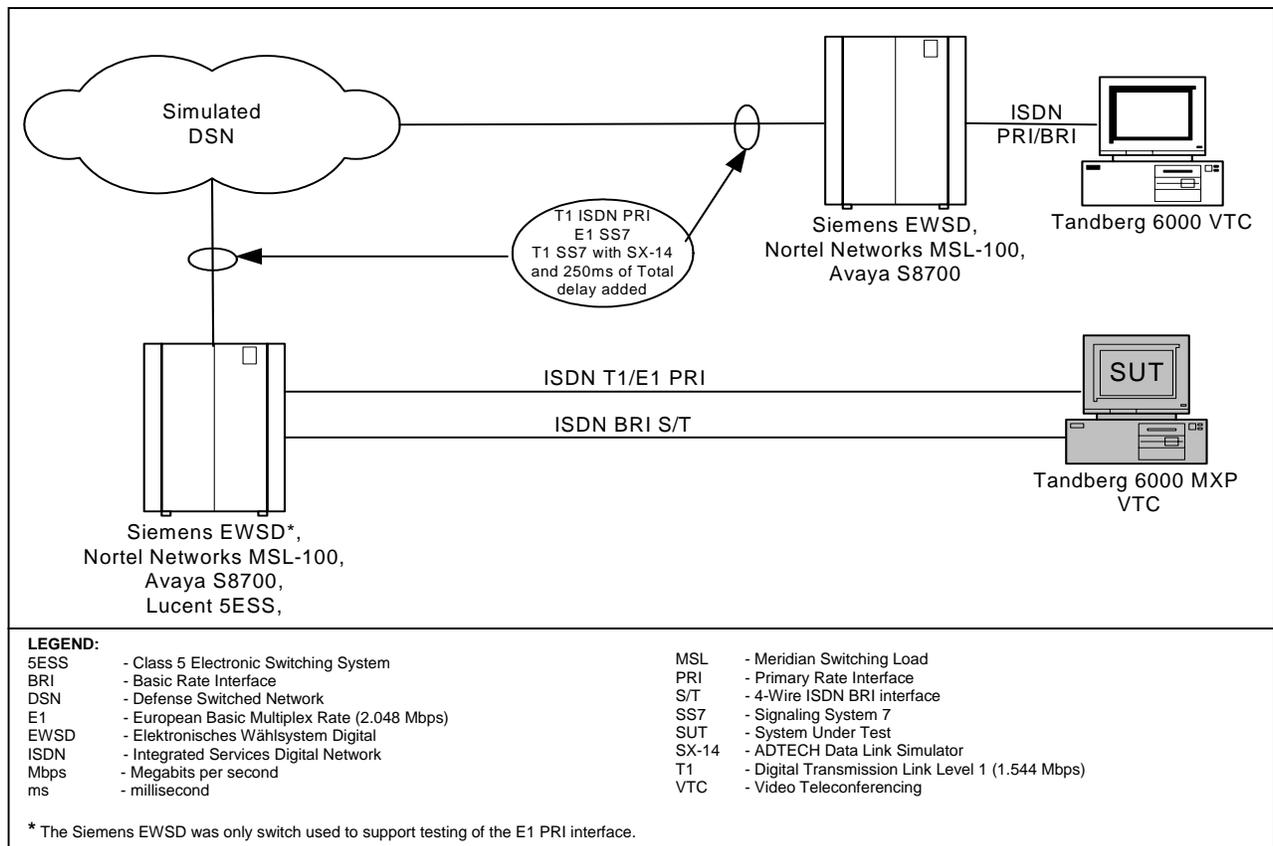


**LEGEND:**

- |          |   |       |   |
|----------|---|-------|---|
| 5ESS     | - Class 5 Electronic Switching System   | Mbps  | - Megabits per second   |
| BRI      | - Basic Rate Interface  | ms    | - millisecond   |
| DSN      | - Defense Switched Network  | MSL   | - Meridian Switching Load   |
| E1       | - European Basic Multiplex Rate (2.048 Mbps)  | PRI   | - Primary Rate Interface  |
| EIA      | - Electronic Industries Alliance  | SS7   | - Signaling System 7  |
| EIA-366A | - Standard for interface between data terminal equipment and automatic calling equipment for data communication   | SUT   | - System Under Test   |
| EIA-449  | - Standard for 37-position and 9-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange | SX-14 | - ADTECH Data Link Simulator  |
| EIA-530  | - Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange                | T1    | - Digital Transmission Link Level 1 (1.544 Mbps)  |
| EWSD     | - Elektronisches Wählsystem Digital   | U     | - 2-wire ISDN BRI interface   |
| ISDN     | - Integrated Services Digital Network   | V.35  | - Standard for data transmission at 48 kbps using 60-108 KHz group band circuits                                  |
| ITU-T    | - International Telecommunication Union - Telecommunication Standardization Sector  | V.36  | - Modems for synchronous data transmission using 60-108 KHz group band circuits                                   |
| kbps     | - kilobits per second   | V.37  | - Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 KHz group band circuits |
| KHz      | - Kilohertz   | VTC   | - Video Teleconferencing  |
|          |   | X3    | - Three ISDN BRI interfaces   |

**NOTE:** The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37.

**Figure 2-2. Test Configuration with Integrated Access Switch**



**Figure 2-3. Test Configuration without Integrated Access Switch**

**9. SYSTEM CONFIGURATIONS.** Table 2-2 provides the system configurations used in the test.

**Table 2-2. Tested System Configurations**

System Name	Software Release
Siemens EWSD	19d with Patch Set 43
Nortel Networks MSL-100	SE06
Avaya S8700	CM 3.0 (R012x.01.0.411.7-7216)
Lucent 5ESS	5E16.2 SU 05-0005
Adtran 890	Firmware Version A.10, Boot ROM Ver. A.03
Tandberg 6000 MXP (SUT)	F.2.3 NTSC

**LEGEND:**

5ESS	- Class 5 Electronic Switching System	ROM	- Read Only Memory
CM	- Communication Manager	SE	- Succession Enterprise
EWSD	- Elektronisches Wählsystem Digital	SU	- Software Update
MSL	- Meridian Switching Load	SUT	- System Under Test
NTSC	- National Television Standards Committee	Ver.	- Version

**10. TEST LIMITATIONS.** None.

## 11. TEST RESULTS

**a. Discussion.** The SUT minimum critical interoperability interface and functional requirements were met through both interoperability certification testing conducted at the JITC GNTF and review of the vendor's LoC.

**(1) Test Conduct.** Bonding mode 1 was tested to requirements defined in GSCR, paragraph A8.5 and Federal Telecommunications Recommendation 1080B-2002. Bonding, often referred to as channel aggregation, takes place through inverse multiplexing. Inverse multiplexing takes a high-bandwidth signal and splits it for transport through the network over multiple lower-bandwidth channels. At the receiving end, the multiple, lower-bandwidth signals are recombined into the original high-bandwidth signal. Five 384-kbps bonding mode 1 test calls at different durations (15-minute, 30-minute, 1-hour, and 24-hours) were placed over the test networks shown in figures 2-2 and 2-3 via all the combinations shown in table 2-3. A passed test result as shown in table 2-3 was based on 100% of the calls receiving a score of four or better on the subjective quality scale as defined in table 2-4. Seven- and ten-digit calls were placed to verify that the SUT met the capability to support both the North American Numbering Plan and the DSN World Wide Numbering and Dialing Plan. To simulate a DSN network, Asynchronous Transfer Mode transport equipment was used along with a SX-14 data-link simulator to inject delay and bit errors.

**(2) Test Results.** Table 2-3 depicts the bonding mode 1 VTC test calls and results.

**Table 2-3. SUT 384-kbps Bonding Mode 1 Interface Test Results**

SUT Interface to Adtran 890	Adtran 890 Interface to DSN	384-kbps Bonding Mode 1 Test Results
EIA-366A, EIA-449	ISDN BRI	Passed
EIA-366A, EIA-530	ISDN BRI	Passed
EIA-366A, ITU-T V.35*	ISDN BRI	Passed
SUT Interface to DSN		384-kbps Bonding Mode 1 Test Results
ISDN T1 PRI		Passed
ISDN E1 PRI		Passed
ISDN BRI		Passed
<b>LEGEND:</b> BRI - Basic Rate Interface DSN - Defense Switched Network E1 - European Basic Multiplex Rate (2.048 Mbps) EIA - Electronic Industries Alliance EIA-366A - Standard for interface between data terminal equipment and automatic calling equipment for data communication EIA-449 - Standard for 37-position and 9-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange EIA-530 - Standard for 25-position interface for data terminal equipment and data circuit-terminating equipment employing serial binary data interchange ISDN - Integrated Services Digital Network ITU-T - International Telecommunication Union-Telecommunication Standardization Sector kbps - kilobits per second KHz - KiloHertz Mbps - Megabits per second PRI - Primary Rate Interface SUT - System Under Test T1 - Digital Transmission Link Level 1 (1.544 Mbps) V.35 - Standard for data transmission at 48 kbps using 60-108 KHz group band circuits V.36 - Modems for synchronous data transmission using 60-108 KHz group band circuits V.37 - Synchronous data transmission at a data signaling rate higher than 72 kbps using 60-108 KHz group band circuits		
<b>NOTES:</b> The electrical physical interface tested was ITU-T V.35 in accordance with ITU-T V.36/V.37.		

**Table 2-4. Video and Voice Subjective Quality Scale**

Rating	Reference	Definition
1	<i>Unusable</i>	<u>Quality is unusable.</u> Voice and video may be heard and seen but is unrecognizable.
2	<i>Poor</i>	<u>Quality is unusable.</u> Words and phrases are not fully understandable or video cannot be properly identified.
3	<i>Fair</i>	<u>Quality is seriously affected by distortion.</u> Repeating words and phrases are required to convey speech or video is seriously impacted and barely recognizable.
4	<i>Good</i>	<b><u>Quality is usable.</u> Audio or video is not impaired but some distortion is noticeable</b>
5	<i>Excellent</i>	<u>Quality is unaffected.</u> No discernable problems with either audio or video.
<small>NOTE: Audio and video quality during a conference will <b>receive</b> a subjective rating on the Data Collection Form. A rating of lower than 4 on this reference scale is considered a failure.</small>		

**b. Test Summary.** The SUT software load F2.3 addressed the following issues:

- (1) Improved Advanced Audio Coding-Low Delay (AAC-LD) performance during a call.
- (2) Corrected DTMF tones on audio out 2.
- (3) Corrected an issue where the system might be in a state that would prevent any future ITU-T H.320 calls after disconnecting an ITU-T H.320 connection
- (4) Changed the default settings for Network Type to ISDN when the ISDN bandwidth key is entered.
- (5) Corrected the possible restart of the codec when entering the Leased E1/T1 settings.

The SUT met the critical interface and functional requirements for a VTC system for the interfaces depicted in table 2-1, as set forth in reference (c), and is certified for joint use within the DSN. The SUT supports ITU-T H.323 and SIP Internet Protocol interfaces. There are no Joint Staff requirements defined for VTC via ITU-T H.323 or SIP to guarantee assured service, therefore, the ITU-T H.323 and SIP interfaces are not covered by this certification.

**12. TEST AND ANALYSIS REPORT.** No detailed test report was developed, in accordance with the Program Manager’s request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNet), or <http://199.208.204.125> (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>.